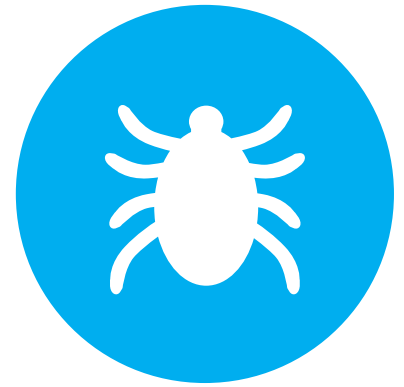
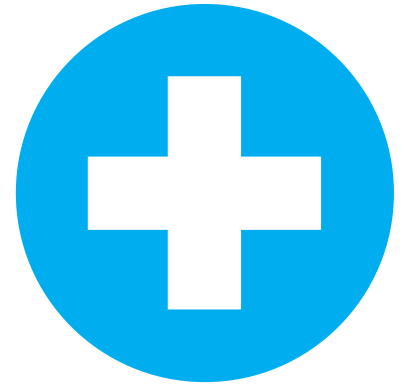
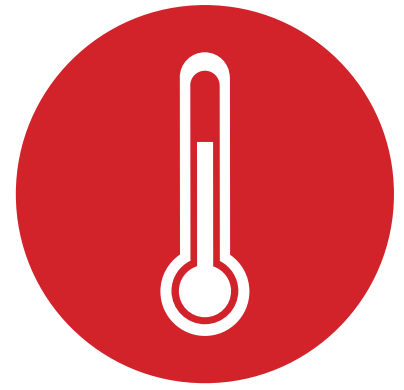




STOCKHOLM COUNTY 2100
WARMER AND WETTER

VENICE OF THE NORTH

WARMER AND WETTER

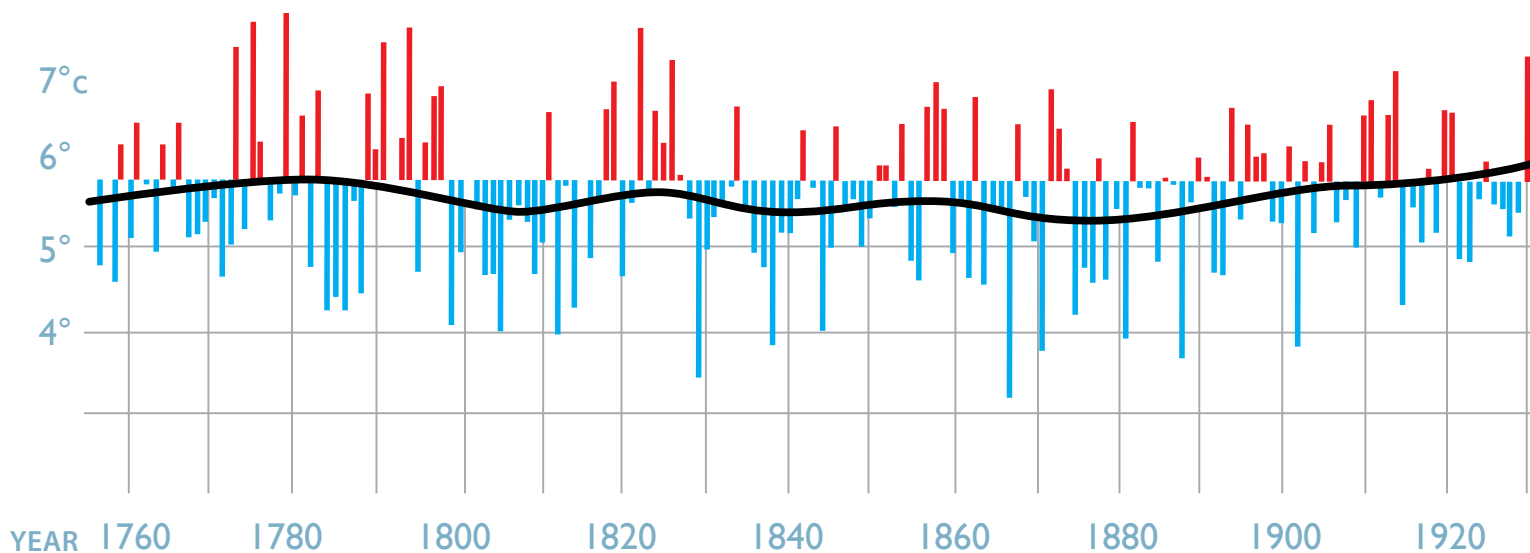
THE FUTURE CLIMATE IN STOCKHOLM will subject our society and natural environment to increasing strain. Here, you can see what climate change will entail for the region in this century. What are our weak spots, now and in the future? Climate change affects all of our lives on a daily basis. You too can influence how we deal with it.

TODAY NO-ONE CAN SAY exactly how our climate will be in the future, as it depends to a large extent on the amount of greenhouse gases we emit, today and tomorrow. The concentration of carbon dioxide has increased by around 40 percent over the past 150 years, since the birth of industrialisation. Of all the greenhouse gases we emit, carbon dioxide is the one that has contributed the most to global warming. Today's emissions will affect our climate for many years to come.

THE EXTENT OF OUR emissions depends on how our society develops, and population development, consumption patterns and technological development play a major part in this. In order to obtain a picture of our future climate, climate scenarios are used. These are based on estimates of future emissions. To describe the future climate in Stockholm, an emissions scenario from the UN's Intergovernmental Panel on Climate Change, IPCC, is used, which describes social development with medium-high emissions of greenhouse gases during the century.

AVERAGE ANNUAL TEMPERATURE IN STOCKHOLM, 1756–2010

- ▶ The black line shows the average annual values in Stockholm.
- ▶ The red and blue bars show the values measured in Stockholm from 1756 to 2010.
- ▶ The average annual temperature will increase by 4–6 degrees by 2100.
- ▶ The period 1961–1990 is used as a reference in climate research in order to make comparisons with the future.
- ▶ The years 2010–2100 show scenario calculations.



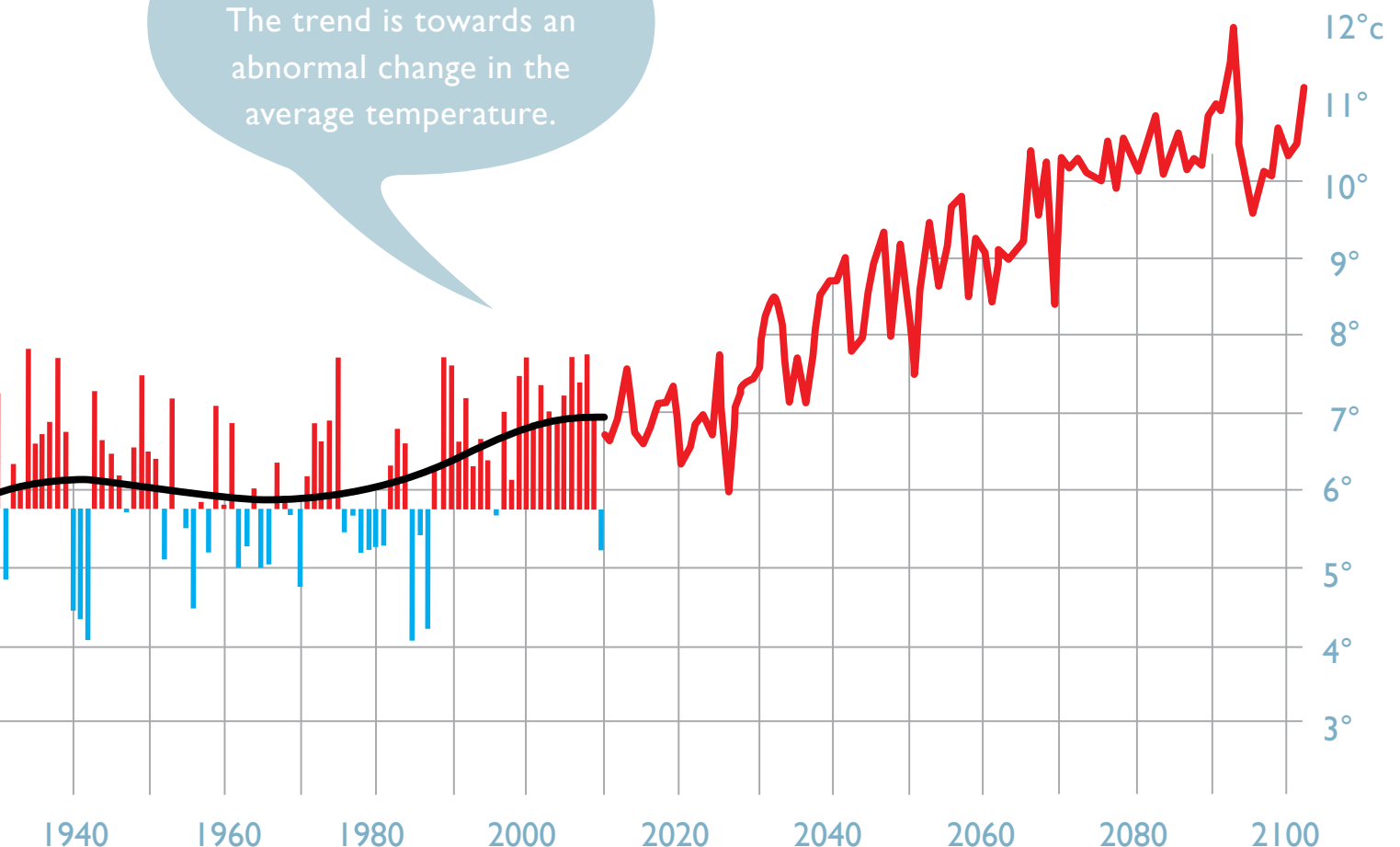
Climate change in Stockholm County

CLIMATE CHANGE IS NOT JUST SOMETHING that will happen in the future or in another country, it is going on already – here and now. The past 15 years have been the hottest since the pre-industrial period. In 2100 the summers may be five degrees warmer, the winters give 30–60 percent more precipitation, and the sea level 30–50 centimetres higher. How will this warmer, wetter climate affect the county of Stockholm and its people, animals and natural environment? The changes and the consequences of such a climate are shown here.

AVERAGE TEMPERATURE, °C			
	Today	In 2100	
WINTER	-3	+2-4	
SPRING	+4.1	+8-10	
SUMMER	+15.4	+19-21	
AUTUMN	+6.7	+10-12	

AVERAGE PRECIPITATION			
	Today, mm	In 2100, mm	In 2100, %
WINTER	132.7	173-212	+30-60
SPRING	102	92-133	-10-+30
SUMMER	190.8	172-248	-10-+30
AUTUMN	183.8	165-239	-10-+30

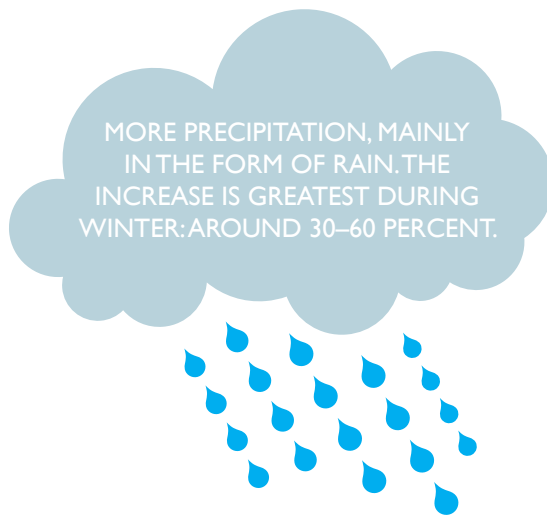
Look at the trend, not the individual years. The trend is towards an abnormal change in the average temperature.



WARMER AND WETTER



Torrential rain takes with it nutrients from agriculture and pollutants from industrial areas. It pollutes our watercourses.



There is a risk that polluted wastewater will enter our watercourses if sewers exceed their capacity during heavy rain.



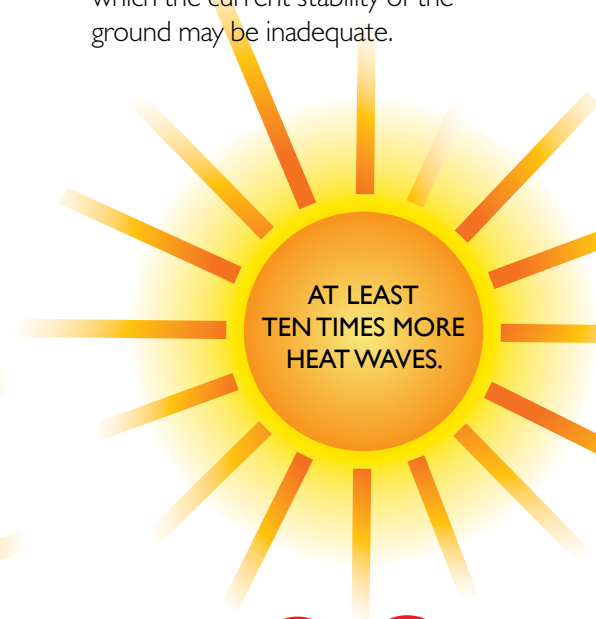
Greater risk of landslides when the ground becomes more waterlogged and less stable. 5,500 properties in the county are in the risk zone, in which the current stability of the ground may be inadequate.



Longer growing seasons result in a larger number of harvests with a greater yield. At the same time, drought, torrential rain and a greater number of pests can damage vegetation and shorten the growing period.



Heat waves increase mortality among the elderly and persons with certain diseases.



Greater risk of vibriosis due to increased bacterial growth in the warmer waters.



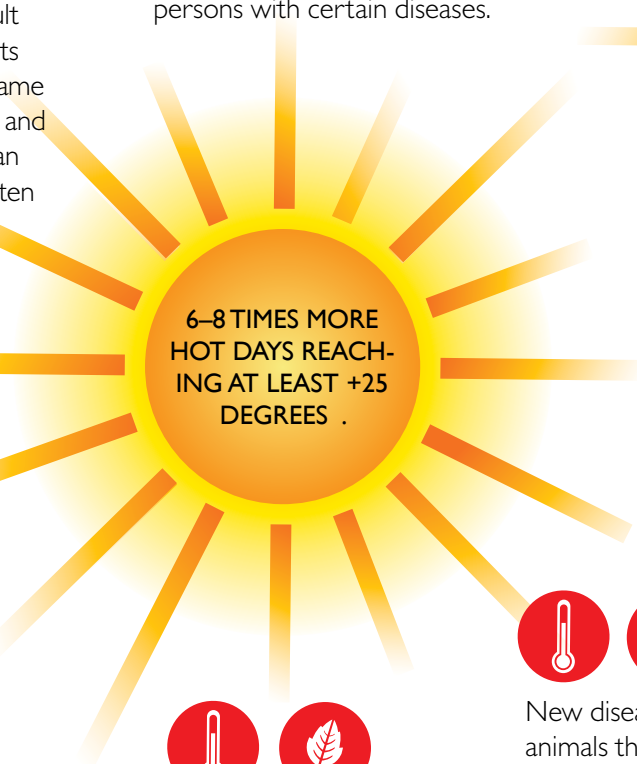
More mosquitoes and ticks, and an increased spread of Lyme disease and TBE.



Algal bloom increases in warmer water.



New diseases and animals that spread disease may emerge in a warmer climate.





Vegetation
Growing
season



Earth fall
Landslide
Erosion



Rising
Heat
Heat wave



Flood
Watercourse
Sea



Poorer
water
quality



Health
Allergy sufferer
Risk of infection



Rising
seas



Greater
precipitation
Rising
watercourses



Lyme disease
TBE



The risk of flooding along our watercourses will increase during winter.

The risk of flooding along Lake Mälaren will decrease when the Slussen site is rebuilt.



Greater risk that roads and railways will be hit by flooding and washout.



MORE FREQUENT
AND HEAVIER
TORRENTIAL RAIN.



RAINIER WINTERS WILL LEAD TO MORE WATER IN OUR WATERCOURSES – AROUND 60–100 PERCENT MORE. WARMER SUMMERS MAKE WATER EVAPORATE MORE QUICKLY AND THE RISK OF LOW WATER INCREASES.



Torrential rain will flood the hard surfaces of the city, giving more floods with risk of mould and damage due to damp, e.g. in cellars.



Tougher times for those with pollen allergies when the pollen season is extended.



Poorer-quality drinking water. Bacteria and micro-organisms thrive in warmer water and can make us ill.

THE GROWING PERIOD WILL BE 100–140 DAYS LONGER THAN AT PRESENT. THIS MEANS A LONGER GROWING SEASON THAT EXTENDS OVER ALMOST THE ENTIRE YEAR. TODAY, THE GROWING PERIOD STARTS IN LATE APRIL.



We will need less heat but conversely more cooling for our buildings. The need for heating will decrease by around 35 percent.



Roach, bream and perch like warmer water, but salmon trout and burbot do not.



More mould and wear and tear on buildings in Stockholm due to a warmer, more humid climate.



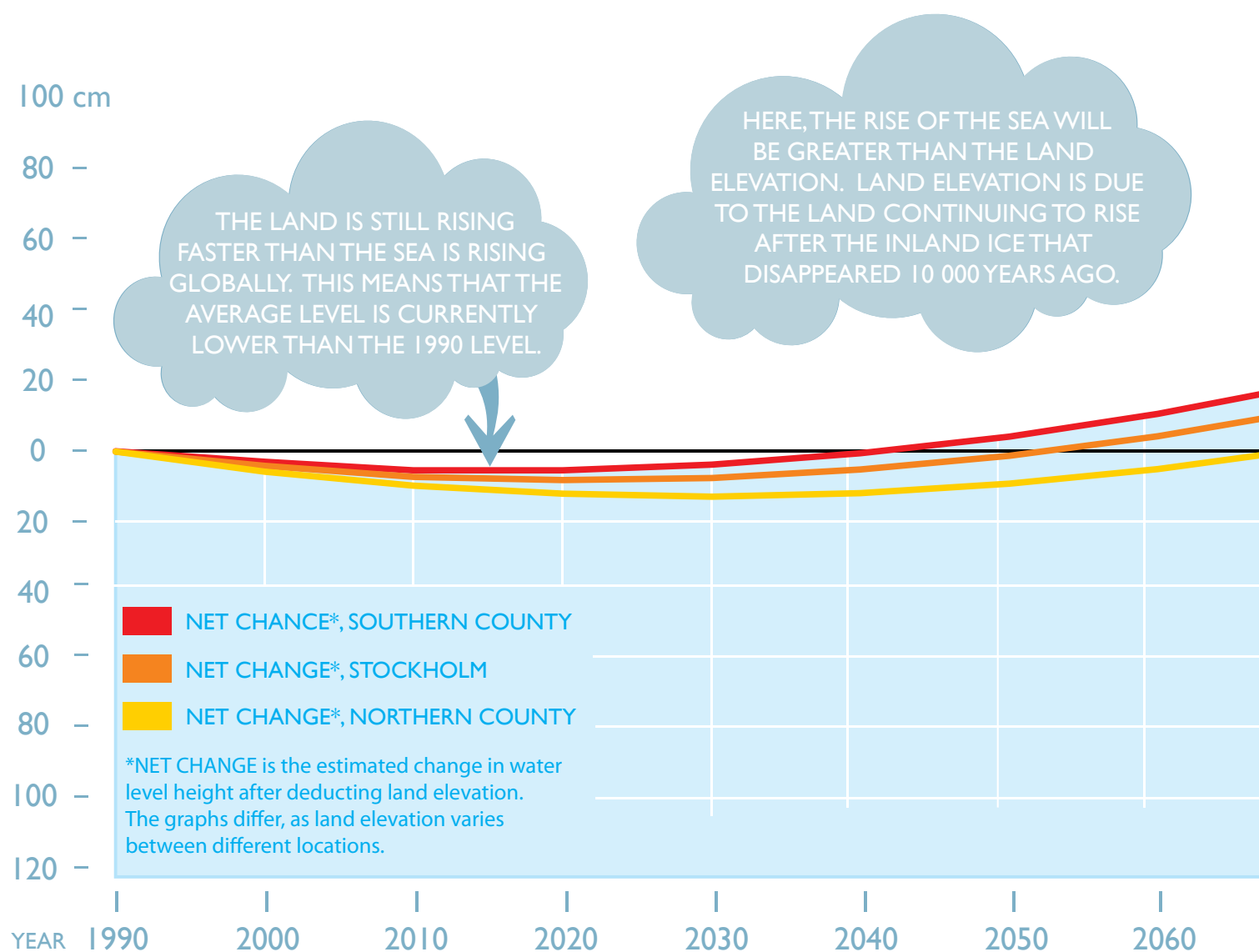
More stomach illnesses. A greater number of hot days means a greater risk of bacteria in food.

THE SEA IS RISING

In 2100 the oceans may be one metre higher than today, according to researchers. This is partially due to the increased temperature causing glaciers and large areas of land ice in Greenland and Antarctica to melt, and partially due to the water expanding when it is heated. Climate change has already made the seas rise at an increasingly rapid pace. Between 1900 and 1980, they rose by 1.5 millimetres per year. Since 1980 they have risen at twice the speed, around 3 millimetres per year.

ESTIMATED CHANGE IN THE AVERAGE WATER LEVEL

The years 1990–2100





Vegetation
Growing
season



Earth fall
Landslide
Erosion



Rising
heat
Heat wave



Flood
Watercourse
Sea



Poorer
water
quality



Health
Allergy sufferer
Risk of
infection



Rising
seas



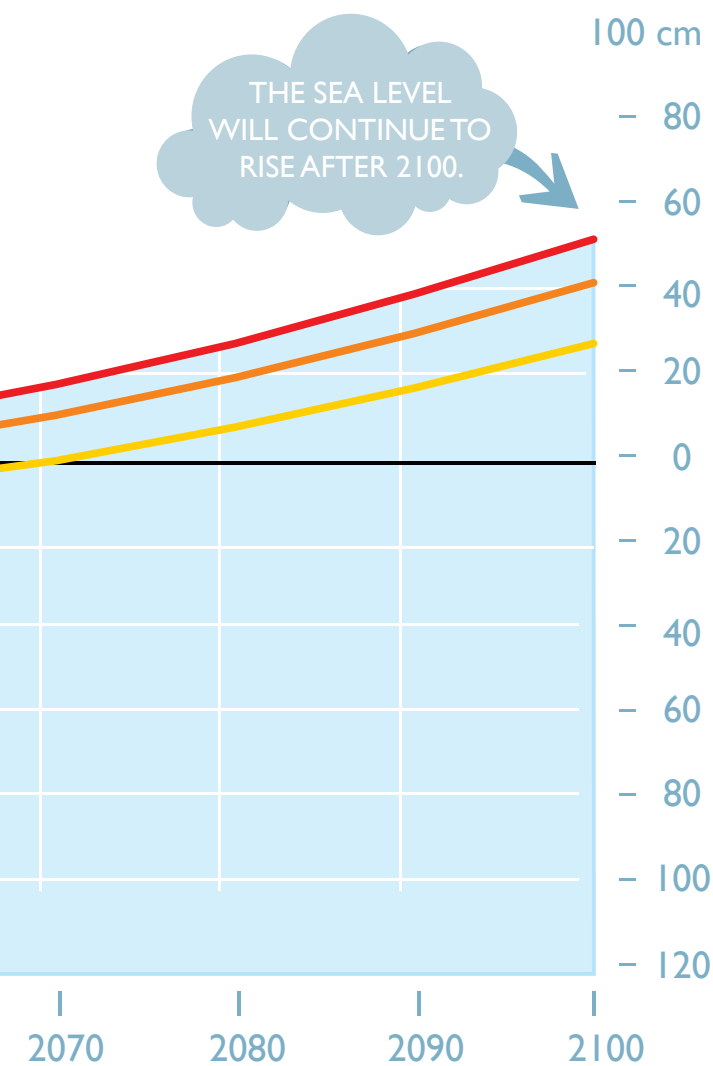
Greater
precipitation
Rising
watercourses



Lyme disease
TBE

ESTIMATED CHANGE IN AVERAGE WATER LEVEL, 2100

SOUTHERN COUNTY	+50 cm
STOCKHOLM	+40 cm
NORTHERN COUNTY	+30 cm



By 2100 the average water level in the county of Stockholm will have risen by between 30 and 50 centimetres. Winds and low pressure will mean that the sea will temporarily rise even more. In our current climate, Stockholm has experienced high water that has been 1.2 metres over the normal level.



When the sea rises, Lake Mälaren needs to be protected from saltwater penetrating it and ruining our drinking water. The new Slussen complex has been designed for this.



In 2100 around 1,300 properties in the area will risk being affected by erosion. This is twice as many as today.



Do you have your own well out in the archipelago? When the sea level rises, the risk of saltwater intrusion increases.



Low-lying buildings and infrastructure will be flooded.

The material was produced for the climate exhibition
VENICE OF THE NORTH – WARMER AND WETTER
part of the County Administrative Board's climate
adaption programme. The purpose is to raise awareness
of problems and solutions and inspire active commitment
on these issues. The exhibition was arranged in
collaboration with SMHI, Ekoteket/Kulturhuset and others.
You are welcome to visit www.nordensvenedig.org

**READ MORE ABOUT THE WORK
ON CLIMATE ADAPTATION AT**
www.lansstyrelsen.se/stockholm/klimatanpassning

FOR MORE INFORMATION, PLEASE CONTACT
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COUNTY ADMINISTRATIVE
BOARD OF STOCKHOLM

Year of publication 2012
ISBN: 978-91-7281-523-0
Illustrations: Beatrice Nordén AB
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